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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/670,316	09/26/2003	Koji Kobayashi		5336

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EXAMINER	
LEWIS, BEN	

ART UNIT	PAPER NUMBER
1745	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/670,316	KOBAYASHI ET AL.	
	Examiner	Art Unit	
	Ben Lewis	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) *1-6 and 22-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6 and 22-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 September 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Detailed Action

1. The Applicant's amendment filed on June 7th, 2007 was received. Claims 1 and 22 were amended. Claims 23 and 24 were added. Claims 7-21 were cancelled.

2. The text of those sections of Title 35, U.S.C. code not included in this action can be found in the prior Office Action (issued on June 30th, 2007).

Specification

3. The amendment filed June 7th 2007 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows:

The system of the fourth and fifth embodiments further includes a start-up hydrogen secondary pressure regulating valve 72b and a start-up hydrogen supply electromagnetic valve 73 in a line 71 in parallel with pressure regulating valve 72a.

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claim 3 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The definitions and locations of the terms "wherein the pressure regulating means includes two regulating valves that are arranged in parallel" are not disclosed in the instant specification. If applicant believes said terms are fully defined, it is requested that applicant indicates column and line, and/or figure with number, identifying the support for wherein the pressure regulating means includes two regulating valves that are arranged in parallel.

Claim Rejections - 35 USC § 102

6. Claims 1-6, 22-24 are rejected under 35 U.S.C. 102(e) as being anticipated by Yang (U.S. Pub. No. 2003/0035986 A1).

With respect to claims 1-3 and 23- 24, Yang discloses a diaphragm pump and anode stream recirculation system using such pump for a fuel cell wherein the anode gas flows through a switch **62** and a pressure regulating device **64** before entering the fuel cell **80** through an anode gas input **82**. The switch **62** can be a solenoid valve

which is used to control the open/close of the gas flow in the piping and to determine whether fresh anode gas should be released from the anode gas supply **60**. The pressure regulating device **64** is used to adjust the pressure of the anode gas flowing therethrough. Generally, the flowing amount of the anode gas is set to be higher than the required Stoichiometric amount for a specific electrical power generation of the fuel cell so as to ensure that the electrochemical reaction takes place completely within the fuel cell **80** (Paragraph 0024).

With respect to a sensor for detecting the concentration of the fuel gas in the fuel chamber, Yang teach that two sensors **106** and **108** sense the position of the piston **90** by the magnet **110** thereon. The flowing rate and the pressure of the anode gas supply **60** are set to be higher than the required stoichiometric amount for a specific electrical power generation of the fuel cell **80** so as to ensure that the electrochemical reaction takes place completely within the fuel cell **80** (Paragraph 0026). Yang further teaches that when the switch **62** is switched on, the anode gas from the anode gas supply **60** with significantly higher pressure will thrust into the whole system, the pressure of the portion **102** thus increases and thereby moves the piston **90** downwardly and compresses the spring **94**. When the piston **90** downwardly moves to a predetermined position, the sensor **108** senses the position of the approaching magnet **110** on the piston **90** and transmits a signal to switch off the switch **62**. At this time, no more fresh anode gas is supplied. As the electrochemical reaction within the fuel cell **80** proceeds, the anode gas will be consumed and the pressure in the system decreases. Therefore, the piston **90** is forced upwardly by the elastic force of the spring **94** and the

atmospheric pressure to further expel the anode gas stored in the portion **102** into the fuel cell **80**. As the electrochemical reaction within the fuel cell **80** continues, the anode gas within the portion **102** will be consumed progressively, and the excessive anode gas discharged from the fuel cell **80** keeps decreasing. Accordingly, the pressure in the portion **102** keeps decreasing and the pump **90** keeps moving upwardly. When the piston **90** upwardly moves to another predetermined position, the sensor **106** senses the approaching magnet **110** on the piston **90** and thus, transmits another signal to switch on the switch **62**. As a result, fresh anode gas is again supplied from the anode gas supply **60** and thrusts into the whole system, and the piston **90** is therefore compressed downwardly. (It is noted that the position of the pistons correlate directly with the pressure (concentration) of anode gas acting on the piston and since the sensors sense the position of the pistons then they are capable of detecting the concentration of fuel gas).

With respect to control means for controlling the pressure regulating valve responsive to the detected concentration of the fuel gas in the fuel chamber, Yang teach that when the switch **62** "valve" is switched on, the anode gas from the anode gas supply **60** with significantly higher pressure will thrust into the whole system, the pressure of the portion **102** thus increases and thereby moves the piston **90** downwardly and compresses the spring **94**. When the piston **90** downwardly moves to a predetermined position, the sensor **108** senses the position of the approaching magnet **110** on the piston **90** and transmits a signal to switch off the switch **62**. At this time, no more fresh anode gas is supplied (Paragraph 0026).

With respect to the pressure regulating means including two regulating valves that are arranged in parallel, Yang teach that the anode gas flows through a switch **62** and a pressure regulating device **64** before entering the fuel cell **80** through an anode gas input **82**. The switch **62** can be a solenoid valve which is used to control the open/close of the gas flow in the piping and to determine whether fresh anode gas should be released from the anode gas supply **60** (Paragraph 0024).

With respect to a fuel discharge line connected to the fuel chamber and a discharge valve in the fuel gas discharge line, Yang teach that the anode stream recirculation system further comprises two check valves **72** and **74** "discharge valves in fuel gas discharge line" with one provided between the anode gas input **82** of the fuel cell **80** and the diaphragm pump **70**, and the other provided between the anode gas output **84** of the fuel cell **80** and the diaphragm pump **70**. In this preferred embodiment, the check valves **72** and **74** are mounted on the two sides of the diaphragm pump **70** (Paragraph 0024).

With respect to claim 4, It is well known in the fuel cell art that fuel cells are connected to an external load in the normal power generation state as evidenced by Merritt et al. (U.S. Patent No. 5,366,821 Col 7 lines 10-20).

With respect to claims 5-6, Yang discloses a diaphragm pump and anode stream recirculation system using such pump for a fuel cell wherein the anode gas flows through a switch **62** and a pressure regulating device **64** before entering the fuel cell **80** through an anode gas input **82**. The switch **62** can be a solenoid valve which is used to control the open/close of the gas flow in the piping and to determine whether fresh anode gas should be released from the anode gas supply **60**. The pressure regulating device **64** is used to adjust the pressure of the anode gas flowing therethrough. The instant specification recites that it is preferred that the fuel cell system of the present invention further comprises a start switch for turning on and off of the fuel cell system wherein the power generation startup time of the fuel cell includes a predetermined period of time after the start switch is turned on (Paragraph 0014).

. Yang et al does not specifically teach wherein the fuel cell system comprises a start switch and wherein the power generation start-up time of the fuel cell includes a predetermined period of time after the start switch is turned on. However, it is the position of the examiner that such functions are inherent, given that Yang et al and the present application utilize the same pressure regulating system and the fuel cell of Yang would take a period of time after the reactive gasses are charged into the system to generate power. A reference which is silent about a claimed invention's features is inherently anticipatory if the missing feature is necessarily present in that which is described in the reference. In re Robertson, 49 USPQ2d 1949 (1999).

With respect to claim 22, Yang teach that a fuel discharge line connected to the fuel chamber and a discharge valve in the fuel gas discharge line, Yang teach that the anode stream recirculation system further comprises two check valves **72** and **74** "discharge valves in fuel gas discharge line" with one provided between the anode gas input **82** of the fuel cell **80** and the diaphragm pump **70**, and the other provided between the anode gas output **84** of the fuel cell **80** and the diaphragm pump **70**. In this preferred embodiment, the check valves **72** and **74** are mounted on the two sides of the diaphragm pump **70** (Paragraph 0024).

Response to Arguments

7. Applicant's arguments filed on June 7th, 2007 have been fully considered but they are not persuasive.

Applicant's principal arguments are

(a) Yang neither discloses nor suggests anything equivalent to the gas discharge line recited by claim 1 or, more specifically, by claims 22-24. Further, Yang neither discloses nor suggests a pump in the gas discharge line as recited by claims 22 and 24.

(b) Yang neither discloses nor suggests "pressure regulating means" for regulating the pressure of the flow of fuel gas into the fuel cell at one pressure upon startup and at a different pressure for later, normal operation in power generation.

(c) Yang does not disclose or suggest any "pressure regulating means" for changing a supply pressure between a start-up power generating state and a normal power generating state.

(d) Yang does not disclose a sensor for detecting the concentration of the fuel gas within the fuel chamber of a fuel cell.

(e) The examiner reads claim 3 on valves 62 and 64 of Yang. However, valves 62 and 64 of Yang are clearly in series, not in parallel as required by claim 3. Further 62 is an ON/OFF switch and placing it in parallel with 64 would allow gas to bypass pressure regulation by valve 64, contrary to the teaching of Yang.

(f) Yang neither discloses nor suggests a pump in a discharge line capable of purging residual gas from the fuel cell fuel chamber. Further pump 70 of Yang is incapable of establishing a negative pressure within the fuel chamber of a fuel cell.

(g) If one or both of the check valves 72 and 74 is the equivalent of applicants' discharge valve, as alleged by the examiner, then the pressure regulating means of Yang can not be characterized as "in the fuel gas inflow line" while the pump is simultaneously located "in the discharge line between the fuel chamber and the discharge valve as recited by claim 24. Still further, as noted above, Yang neither discloses nor suggests a pump in a discharge line capable of purging residual gas from the fuel cell fuel chamber. Further pump 70 of Yang is incapable of establishing a negative pressure within the fuel chamber of a fuel cell.

In response to Applicant's arguments, please consider the following comments.

(a) With respect to a fuel discharge line connected to the fuel chamber and a discharge valve in the fuel gas discharge line, Yang teach that the anode stream recirculation system further comprises two check valves **72** and **74** "discharge valves in fuel gas discharge line" with one provided between the anode gas input **82** of the fuel cell **80** and the diaphragm pump **70**, and the other provided between the anode gas output **84** of the fuel cell **80** and the diaphragm pump **70**. In this preferred embodiment, the check valves **72** and **74** are mounted on the two sides of the diaphragm pump **70** (Paragraph 0024). (It is noted that diaphragm pump 70 is connected to the fuel discharge line by discharge valve 74, therefore the diaphragm pump is in the discharge line) See Fig 5.

(b) and (c) With respect to the pressure regulating means including two regulating valves that are arranged in parallel, Yang teach that the anode gas flows through a switch **62** and a pressure regulating device **64** before entering the fuel cell **80** through an anode gas input **82**. The switch **62** can be a solenoid valve which is used to control the open/close of the gas flow in the piping and to determine whether fresh anode gas should be released from the anode gas supply **60** (Paragraph 0024).

Furthermore, In response to applicant's argument that Yang neither discloses nor suggests "pressure regulating means" for regulating the pressure of the flow of fuel gas into the fuel cell at one pressure upon startup and at a different pressure for later, normal operation in power generation, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.

(d) With respect to a sensor for detecting the concentration of the fuel gas in the fuel chamber, Yang teach that two sensors **106** and **108** sense the position of the piston **90** by the magnet **110** thereon. The flowing rate and the pressure of the anode gas supply **60** are set to be higher than the required Stoichiometric amount for a specific electrical power generation of the fuel cell **80** so as to ensure that the electrochemical reaction takes place completely within the fuel cell **80** (Paragraph 0026).

Yang further teaches that when the switch **62** is switched on, the anode gas from the anode gas supply **60** with significantly higher pressure will thrust into the whole system, the pressure of the portion **102** thus increases and thereby moves the piston **90** downwardly and compresses the spring **94**. When the piston **90** downwardly moves to a predetermined position, the sensor **108** senses the position of the approaching magnet **110** on the piston **90** and transmits a signal to switch off the switch **62**. At this time, no more fresh anode gas is supplied. As the electrochemical reaction within the fuel cell **80** proceeds, the anode gas will be consumed and the pressure in the system

decreases. Therefore, the piston **90** is forced upwardly by the elastic force of the spring **94** and the atmospheric pressure to further expel the anode gas stored in the portion **102** into the fuel cell **80**. As the electrochemical reaction within the fuel cell **80** continues, the anode gas within the portion **102** will be consumed progressively, and the excessive anode gas discharged from the fuel cell **80** keeps decreasing. Accordingly, the pressure in the portion **102** keeps decreasing and the pump **90** keeps moving upwardly. When the piston **90** upwardly moves to another predetermined position, the sensor **106** senses the approaching magnet **110** on the piston **90** and thus, transmits another signal to switch on the switch **62**. As a result, fresh anode gas is again supplied from the anode gas supply **60** and thrusts into the whole system, and the piston **90** is therefore compressed downwardly. (It is noted that the position of the pistons correlate directly with the pressure (concentration) of anode gas acting on the piston and since the sensors sense the position of the pistons then they are capable of detecting the concentration of fuel gas).

(e) The definitions and locations of the terms "wherein the pressure regulating means includes two regulating valves that are arranged in parallel" are not disclosed in the instant specification. If applicant believes said terms are fully defined, it is requested that applicant indicates column and line, and/or figure with number, identifying the support for wherein the pressure regulating means includes two regulating valves that are arranged in parallel.

(f) and (g) With respect to a pump in the discharge line, Yang teach that the anode stream recirculation system further comprises two check valves **72** and **74** "discharge valves in fuel gas discharge line" with one provided between the anode gas input **82** of the fuel cell **80** and the diaphragm pump **70**, and the other provided between the anode gas output **84** of the fuel cell **80** and the diaphragm pump **70**. In this preferred embodiment, the check valves **72** and **74** are mounted on the two sides of the diaphragm pump **70** (Paragraph 0024). (It is noted that diaphragm pump 70 is connected to the fuel discharge line by discharge valve 74, therefore the diaphragm pump is in the discharge line) See Fig 5.

Furthermore, in response to applicant's argument that Yang neither discloses nor suggests a pump in a discharge line capable of purging residual gas from the fuel cell fuel chamber. Further pump 70 of Yang is incapable of establishing a negative pressure within the fuel chamber of a fuel cell, a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ben Lewis whose telephone number is 571-272-6481. The examiner can normally be reached on 8:30am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

PATRICK JOSEPH RYAN
SUPERVISORY PATENT EXAMINER

Ben Lewis

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Art Unit 1745